



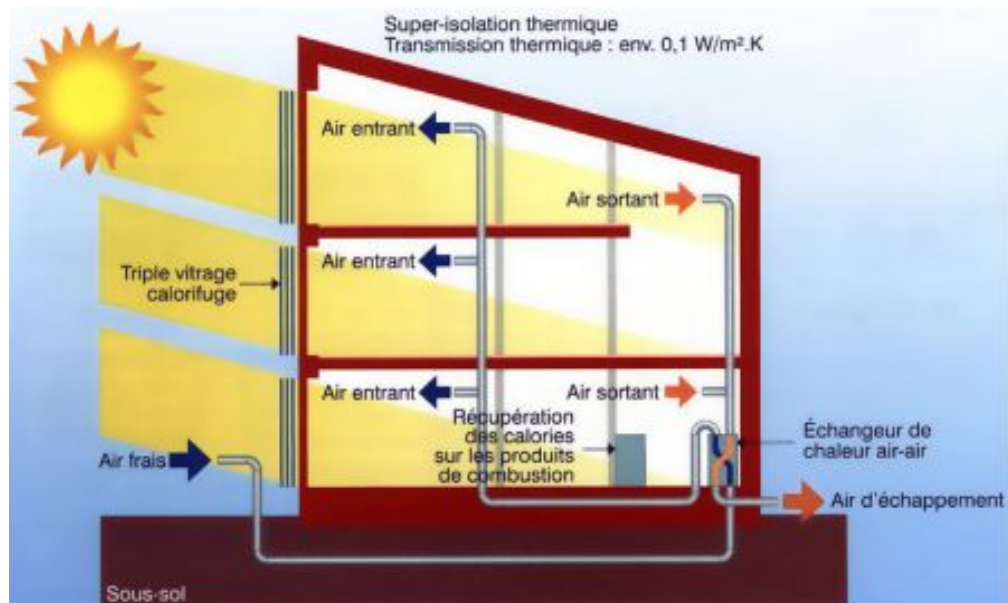
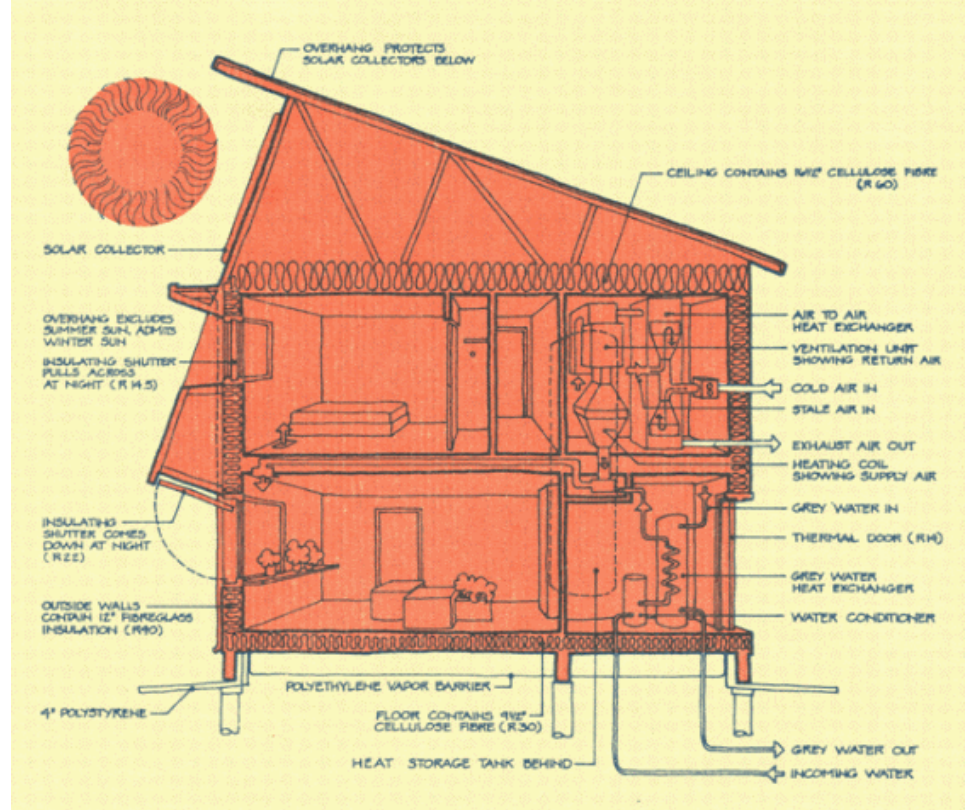
PASSIVE HOUSE
ALLIANCE

H U D S O N V A L L E Y

***1970's Energy Crisis
inspired Conservation***



Saskatchewan Conservation House,
Regina, Saskatchewan, Canada





***“What name should be given to this new system? ...
I lean toward ‘micro-load passive.’ Whatever it is
called, it has (I predict) a big future.”***

-1979, William





Quietly back in Germany... Dr. Wolfgang Feist builds the first modern Passive House in 1991...



... and protégé Katrin Klingenberg builds the first certified Passive House in the US in 2003

Passive House is a building design standard that can reduce energy use by as much as 90% compared to conventional construction.



Thermal Image of Passive House brownstone renovation in Brooklyn

Image: Sam McAfee

Key Principles

**Energy
Efficient
Exterior**

=

**Comfortable
Healthy
Interior**

=

**Low
Energy
Cost**



=



=



Key Concepts

A TYPICAL HOUSE...

uses inadequate insulation and is poorly sealed, leading to wasted energy



A PASSIVE HOUSE...

minimizes air leaks with a continuous air barrier



provides a super-insulated building envelope to control heat loss and gain



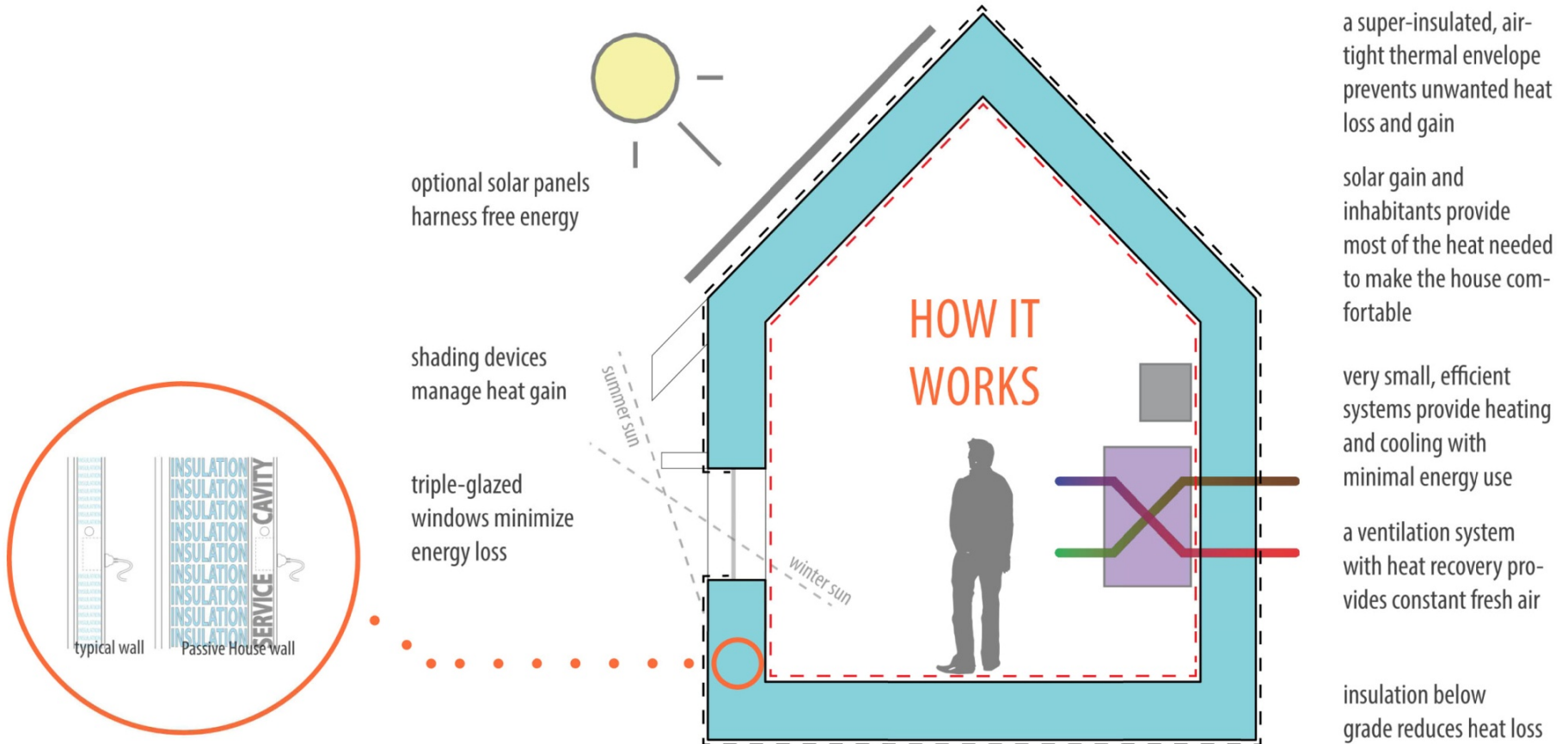
protects the insulation layer with a reliable weather-tight exterior membrane and rain screen



uses intelligent mechanical systems to eliminate waste and increase efficiency

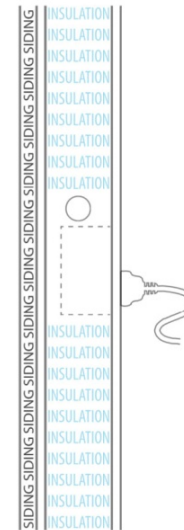


Application

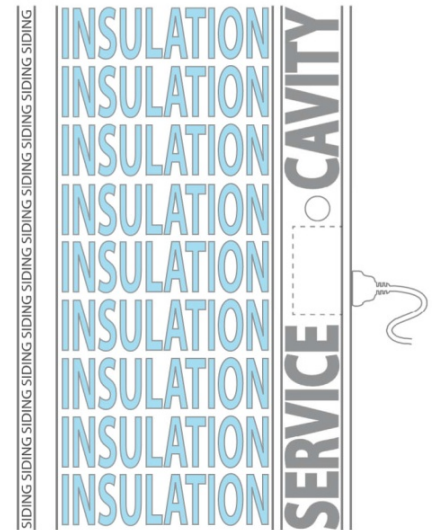


Key Components

- **Air-tight** construction
- Robust exterior **insulation** on all sides
- Effective, whole-house **ventilation** system
- **Minimum heating and cooling** equipment
- **Tripple-glazed**, warm edge windows



TYPICAL WALL ASSEMBLY



PASSIVE HOUSE WALL ASSEMBLY

Ground Plane Insulation as Formwork for Slab

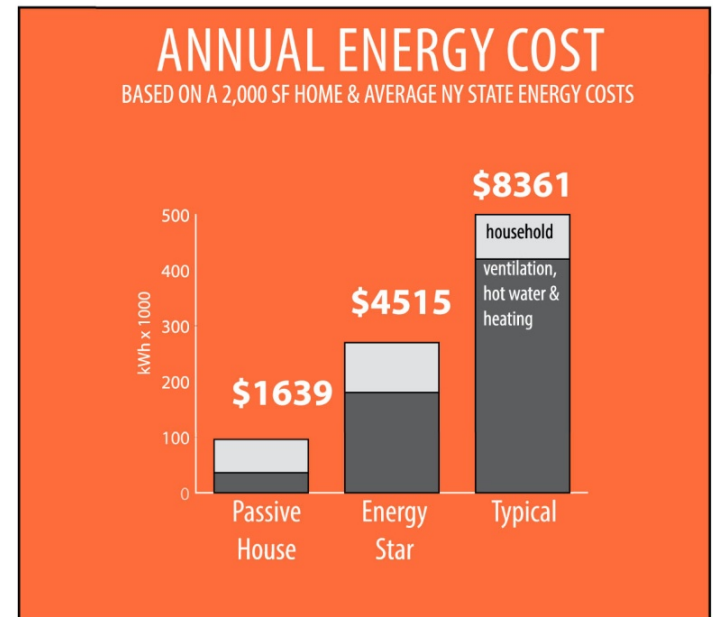
Dublin House – 2010, Urbana Illinois – E-co Lab
Courtesy of Katrin Klingenberg





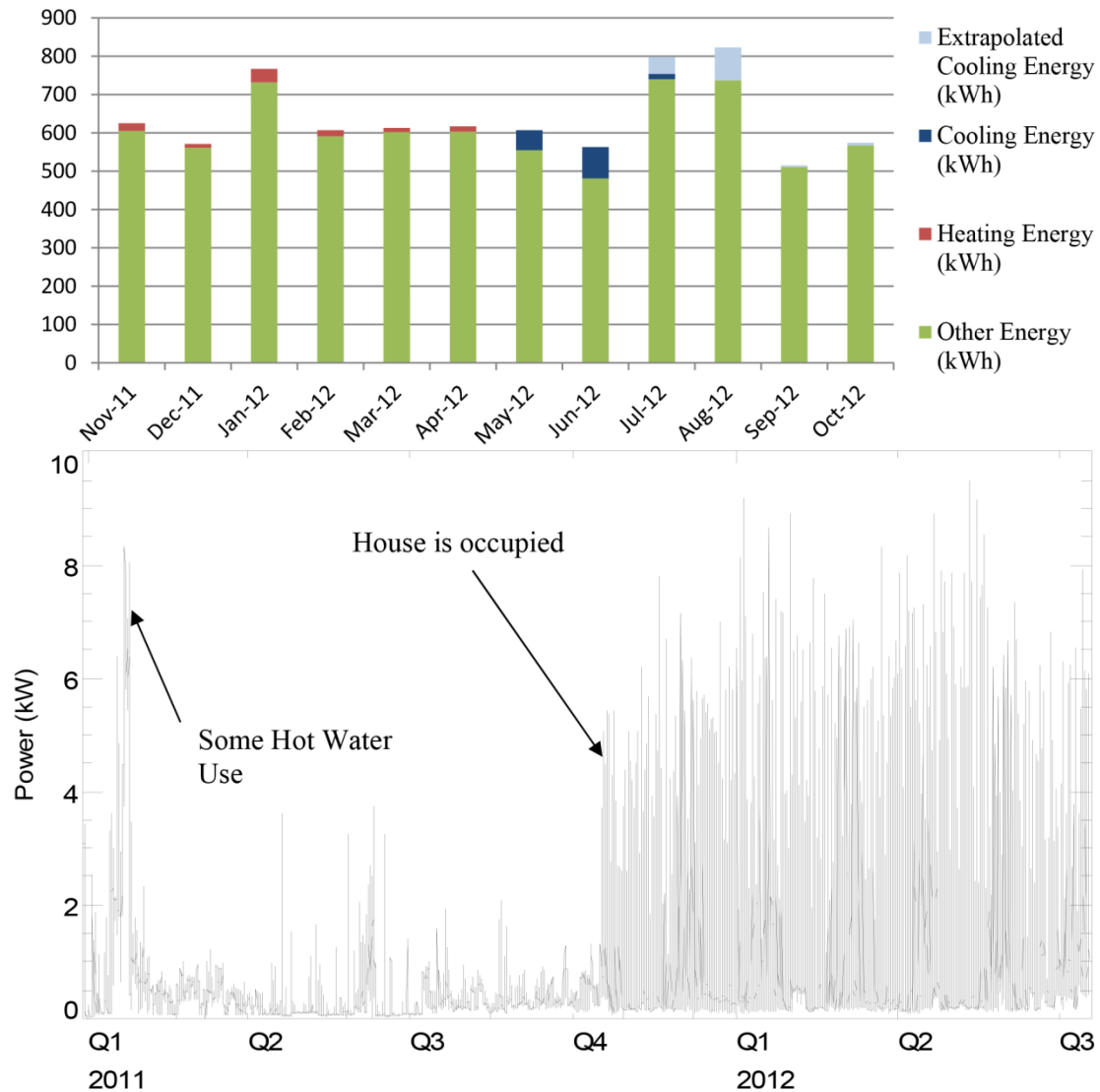
Key Benefits

- **Energy efficient** exterior envelope
- Comfortable, healthy interior environment
- Low operation and maintenance costs
- No need for a fireplace, furnace or chimney
- Low-tech and **immediately available** construction methods
- The opportunity to drastically alter our dependence on fossil fuels comes down to a **design decision**. Nearly 50% of our national energy use is consumed by buildings. Drastic reductions in our energy use can be made by simply choosing how we **build**.



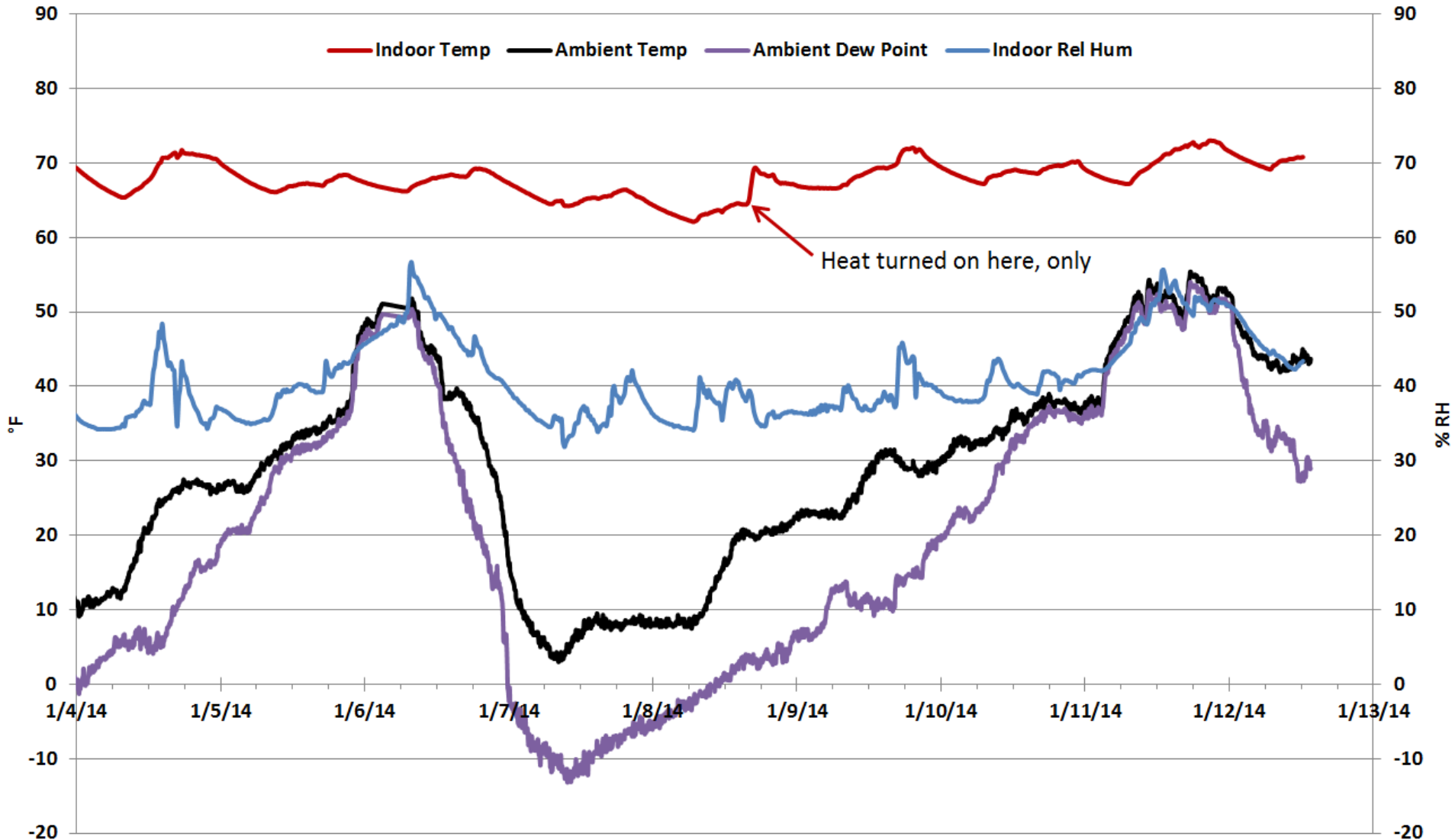
DATA SOURCE: PASSIVE HOUSE INSTITUTE
U.S. ENERGY INFORMATION ADMINISTRATION (2011)

Energy use monitoring



*Monitoring
report courtesy
of Barlis Wedlick
Architects, Levy
Partnership*

Living Room Temperature & Humidity During January 2014 "Arctic Vortex"



Credit: Cramer Silkworth- Baukraft Engineering

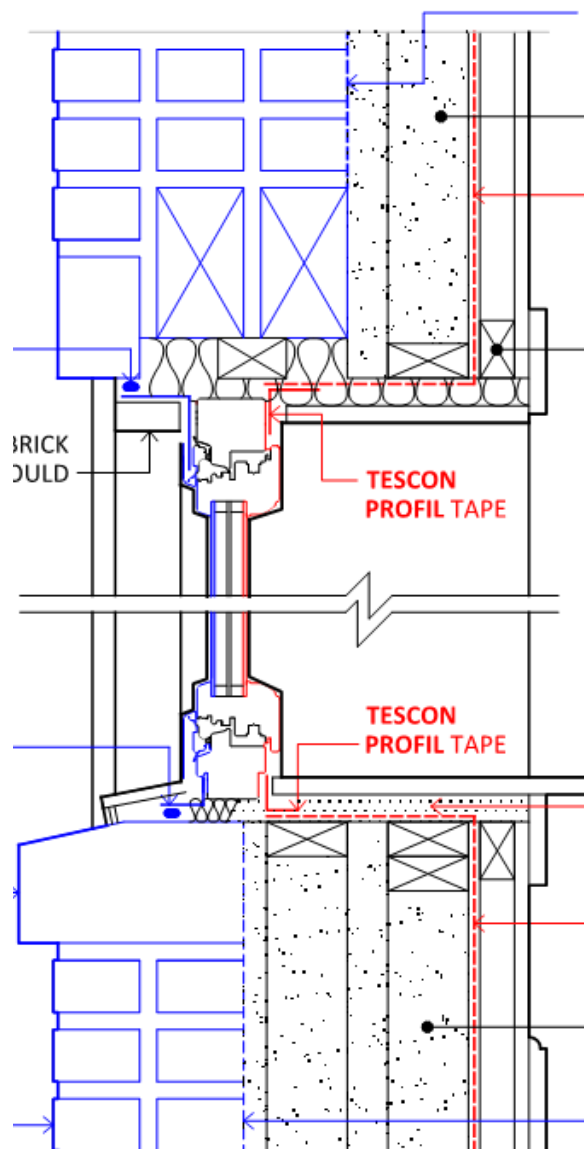
Brooklyn Passive- insulation on the interior to retain historic façade.



Joist Pocket and Party Wall



HEAD/JAMB SIM.



Ready for interior finishes

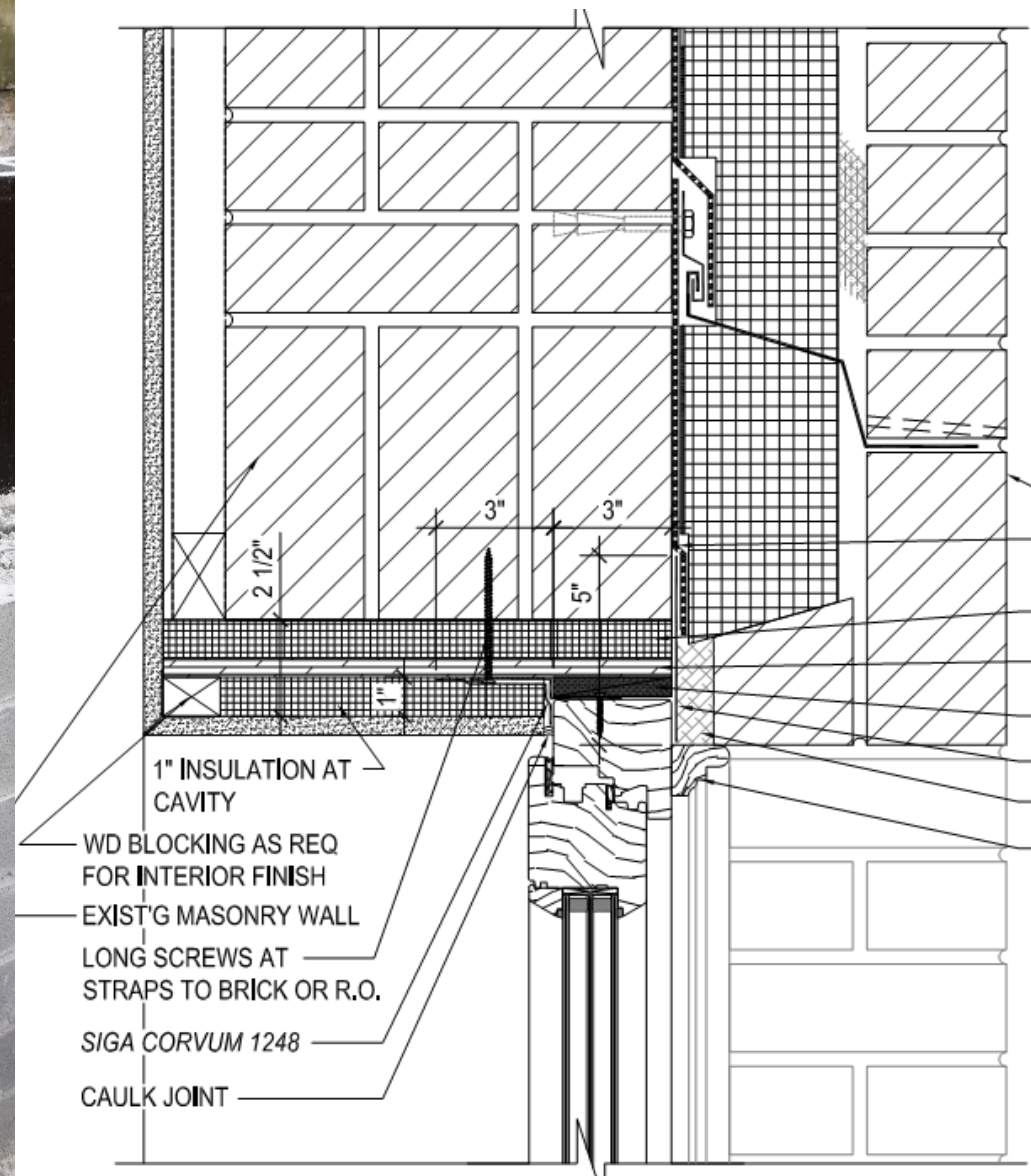


Windows...



Garrison deep energy retrofit- reclaimed brick veneer and continuous insulation over masonry





Multi-Family Projects

- *Little – to no additional costs compared to conventional construction*
- *Geometry and reduced surface to volume ratio*



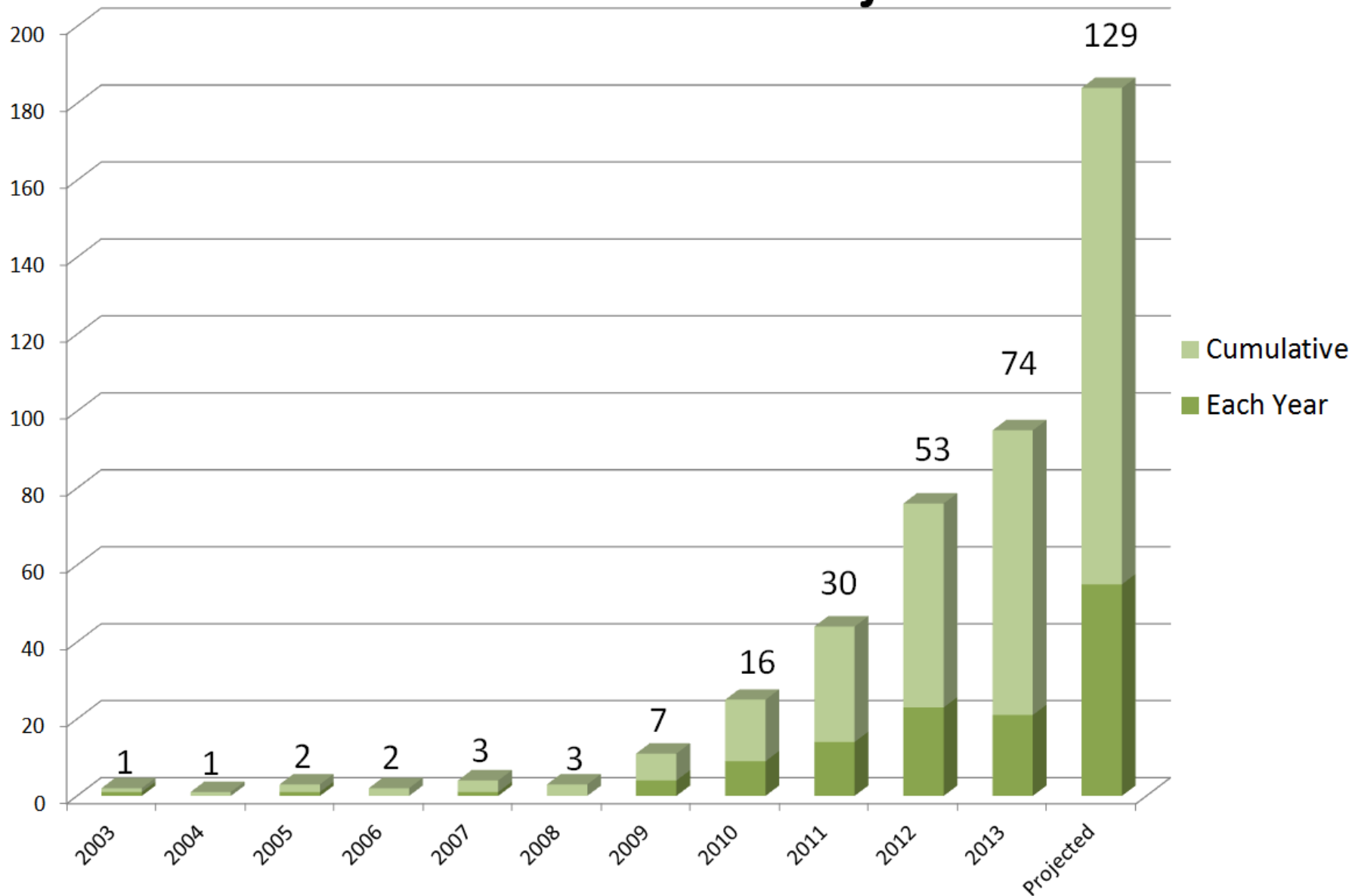
The Stellar Apartments, Eugene, OR- 6 Units, Jan Fillinger + Win Swafford CPHCs, Certified



Orchards at Orenco, Hillsboro, OR- 57 Units, Dylan Lamar CPHC- Pre-Certified

- *Affordable housing agencies and non-profits benefit greatly with reduced operating costs*
- *Improved connectivity to urban environments*

PHIUS+ Certified Projects



*Most buildings in 2050 — less than forty years from now — will likely have to get by with perhaps 10% of the carbon footprint common in the U.S. today. ... anything built today that is significantly less efficient than the roughly **90% energy savings achieved by Passivhaus**, seems designed to be obsolete.*

— Editors, Architecture Week